

accordingly, Applicant has respectfully attached a copy of said form hereto, and requests that the entry be initialed to confirm consideration of the cited document.

Applicant wishes to thank the Examiner for the courtesies extending in granting and conducting on February 11, 2003, a personal interview with Applicant's representative. At the interview, Applicant's representative and the Examiner discussed the Official Action.

In that Official Action, Claims 61, 62, and 69 through 72 were variously rejected under 35 U.S.C. §§ 102 and 103 over U.S. Patent No. 5,418,639 (Yamazaki). Claims 63 through 68 were objected to and indicated as being allowable if rewritten in independent form. All rejections and objections are respectfully traversed.

Claims 63 and 73

Turning to the objected-to claims, Claim 63/61 has been rewritten in independent form as Claim 63.

Claim 63/62 has been rewritten in independent form as Claim 73. It will also be appreciated that Claims 74 through 78 ultimately depending therefrom have been formulated upon the basis of objected-to Claims 64 through 68 (and thus upon the basis of Claims 3, 4, and 6 through 9 of U.S. Patent No. 5,883,732 (Takada, et al.)).

Claim 61

Turning to the rejected claims, Claim 61 recites, inter alia, that the curvatures in the sub-scanning direction of the two specified surfaces of the imaging lens vary independently of the curvatures in the main scanning direction.

However, Applicant respectfully submits that Yamazaki fails to disclose or suggest at least the above-discussed claimed features as recited, inter alia, in Claim 61. In more detail, the Official Action asserts that the equation

$$rh(\pm) = r_0 + (1 + k(\pm) \cdot R_p \cdot \alpha / n) \cdot R \cdot [1 - \cos\{\sin^{-1}(h / R)\}]$$

in Yamazaki (where rh is the radius of curvature in the secondary scanning direction, and R is the radius of curvature in the primary scanning direction at the optical axis) teaches the above-discussed claimed features. This assertion is respectfully traversed. Applicant respectfully submits that in this equation rh is a function of and thus depends upon R (see, e.g., the embodiments of Yamazaki which have different values of R and thus of rh). The Official Action also makes reference to col. 8 of Yamazaki which states that:

“a cylindrical toric, symmetrical or deformed cylindrical surface may be included in this optical scanning system, and a plurality of non-symmetrical surfaces with respect to the optical axis may be included. Further, a plurality of non-symmetrical surfaces with respect to the optical axis may be utilized.”
(col. 8, lines 16-22).

Applicant respectfully submits that neither the foregoing equation and col. 8 disclosure nor the remainder of Yamazaki provides either a description or a suggestion of at least the above-discussed claimed features as recited, inter alia, in Claim 61. By means of such features, Applicant respectfully submits that it is possible to permit a more flexible design of the lens with higher latitude.

Furthermore, Applicant respectfully directs the Examiner’s attention to MPEP 2307.02, which states that Group Director approval is necessary for the rejection of claims copied

from a patent where the ground of rejection is also applicable to the corresponding claim in the patent.

Claim 62

Claim 62 recites the above-discussed feature of Claim 61 in combination with the recitation that the optical magnification of the imaging lens in the sub-scanning direction is constant over the effective scanning region.

However, Applicant respectfully submits that Yamazaki fails to disclose or suggest at least the above-discussed claimed combination of features as recited, inter alia, in Claim 62. In more detail, the Official Action asserts at page 3, lines 1-5 that the equation " $k(+)-k(-)>0.005M^2$ " in Yamazaki, where $k(+)$ represents a coefficient on the "+" image height side, $k(-)$ represents a coefficient on the "-" image height side, and M represents a lateral magnification in the secondary scanning direction of the optical scanning system (see col. 3, lines 60-64; col. 4, lines 34-43) shows that the magnification is constant over the effective scanning region. As discussed at the interview, this assertion is respectfully traversed. Applicant respectfully notes that the magnification M is the magnification along the optical axis, and the cited equation places a restriction on the values of $k(+)$ and $k(-)$, given M (in the first embodiment, for example, $M=3.03$, and $k(+)$ and $k(-)$ are respectively set to -0.49620×10^{-2} and -0.10420 (col. 6, lines 26-30)). Accordingly, Applicant respectfully submits that the cited equation in no way teaches or suggests that the magnification is constant over the effective scanning region.

With further reference to the constant magnification feature, during the interview the Examiner directed Applicant's attention to col. 1, lines 60-65 of Yamazaki which states that "the fluctuation of the size of a spot of the secondary scanning direction is suppressed

so that it can be maintained within a region of 10%". Applicant has carefully reviewed said section of Yamazaki, and respectfully submits that it provides neither a description nor a suggestion of the claimed constant magnification feature. In more detail, Applicant respectfully submits that Yamazaki teaches correction of the image surface curvature (e.g., col. 1, lines 41-49; col. 3, lines 1-9; and col. 8, lines 24-31), but is manifestly silent as to the claimed constant magnification feature. Applicant respectfully submits that correcting fluctuation of the size of the spot by changing or adjusting the image surface curvature is not interrelated with but instead is independent from changing or adjusting the magnification, and the artisan would readily have understood that the range of 10% could be achieved even if the magnification is not constant.

Claim 70

Claim 70 recites, inter alia, the above-discussed features of Claim 61 in combination with the recitation that the imaging lens has a surface having a point of inflection in the main scanning direction.

However, Applicant respectfully submits that Yamazaki fails to disclose or suggest at least the above-discussed combination of claimed features as recited, inter alia, in Claim 70. In more detail, the Official Action asserts that Yamazaki has a point of inflection where the optical axis intersects the lens surface. This assertion is respectfully traversed. A point of inflection is where the curvature changes from concave to convex or convex to concave. See attached definition from the McGraw Hill Dictionary of Scientific and Technical Terms, 5th Ed. (1994), p. 1535, left col. Further in this regard, attached hereto as an Appendix are copies of Fig. 6 of U.S. Patent No. 5,883,732 (Takada, et al.) and a copy of Fig. 4A of the subject

application, on which the point of inflection is indicated. Applicants respectfully submit that Yamazaki has no such point of inflection, as claimed.

The dependent claims are also submitted to be patentable because they set forth additional aspects of the present invention and are dependent from independent claims discussed above. Therefore, separate and individual consideration of each dependent claim is respectfully requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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MARKED-UP CLAIM SHEET

62. (Amended) [An] In an optical scanner [according to claim 61,] having a source of a light beam, a deflector for deflecting said light beam and an imaging lens that focuses the deflected light beam to form a beam spot on a surface to be scanned, the improvement wherein the curvatures in a sub-scanning direction of two of the surfaces of said imaging lens vary continuously along a main scanning direction over the effective area of said imaging lens and independently of the curvatures in the main scanning direction, and wherein the curvatures in the main and sub-scanning directions are non-symmetrical with respect to the optical axis,

wherein the optical magnification of said imaging lens in the sub-scanning direction is constant over the effective scanning region.

63. (Amended) [An] In an optical scanner [according to claim 61 or 62,] having a source of a light beam, a deflector for deflecting said light beam and an imaging lens that focuses the deflected light beam to form a beam spot on a surface to be scanned, the improvement wherein the curvatures in a sub-scanning direction of two of the surfaces of said imaging lens vary continuously along a main scanning direction over the effective area of said imaging lens and independently of the curvatures in the main scanning direction, and wherein the curvatures in the main and sub-scanning directions are non-symmetrical with respect to the optical axis,

wherein said imaging lens is a single lens.

70. (Amended) [An] In an optical scanner [according to claim 69,] having a source of a light beam, a deflector for deflecting said light beam and an imaging lens that focuses the deflected light beam to form a beam spot on a surface to be scanned, the improvement wherein the curvatures in a sub-scanning direction of two of the surfaces of said imaging lens vary continuously along a main scanning direction over the effective area of said imaging lens and independently of the curvatures in the main scanning direction, and wherein the curvatures in the main and sub-scanning directions are non-symmetrical with respect to the optical axis,

wherein said imaging lens has a surface that is aspheric in the main scanning direction, and

wherein said imaging lens has a surface having a point of inflection in the main scanning direction.